



Focus

Controlling Wood Smoke Pollution

Background

Washington's wood heat regulation implements the 1991 Legislature's Clean Air Washington Act. The 1991 legislation restricts indoor burning and emphasize education and enforcement to control wood stove pollution.

Pollution from wood smoke

Nearly half of Washington's households have wood burning devices. During the past 20-25 years the number of wood stoves, fireplaces, pellet stoves, and fireplace inserts in Washington State has grown rapidly. Wood burning units can emit hundreds of times more pollution than other forms of heat such as natural gas, electricity, or oil.

Heating with wood accounts for about 11 percent of Washington's air pollution on an annual basis. The impact of this pollution is much larger for two reasons:

- Virtually all of it is released during winter months. It takes just half the year for wood smoke to become Washington's third leading source of air pollution.
- A common feature of Washington's winter climate is stagnant air. Wood smoke does not disperse under such conditions. It is trapped near the ground and accumulates in the neighborhood air.

Wood smoke and health

The smoke from wood burning devices can cause serious health problems. Breathing air containing wood smoke contributes to cardiovascular problems; lung diseases like asthma, emphysema, pneumonia and bronchitis; irritation of the lungs, throat, sinuses and eyes; headaches; and allergic reactions. Those with the greatest health risk from wood smoke include infants and children, pregnant women and people with lung and heart diseases.

There are hundreds of chemical compounds in wood smoke, including many that are irritating and potentially cancer-causing. Wood smoke pollutants include nitrogen oxides, carbon monoxide, organic gases and particulate matter. University of Washington studies show decreased lung function and increased respiratory disease in both healthy and asthmatic children exposed to wood smoke in some Seattle neighborhoods.

Particulate matter, the fine material that makes up smoke and soot, may be the most insidious component of wood smoke pollution. Most of these particles are so small that when inhaled they get past the hairlike cilia that protect the air passages of the lungs. They can lodge in the deepest part of the lungs, where the blood takes on oxygen. The particles can cause structural and biochemical changes, including scarring of the tissue. Many of the particles are toxic. Death rates in several U.S. cities have been shown to increase with higher levels of fine particulate matter in the air.

Washington's wood smoke control program

The 1991 Legislature established a program to help protect the public from wood smoke pollution, especially in residential areas. The Clean Air Washington Act of 1991 tightened emission standards for new wood stoves and other solid fuel burning devices.

The current program

- **Installation of uncertified stoves** is banned since January 1, 1992. Some jurisdictions have more stringent regulations. Please consult your local air pollution control agency (see page 4).
- **Non-wood heat sources** are required since July 1, 1992 in new or substantially remodeled construction in urban areas or areas that don't meet federal air quality standards for particulate matter. This is so that wood is not the sole source of adequate heat.
- **Wood fuel must have a moisture content of 20 percent or less.** Wood that is split, then dried for at least a year, usually meets this requirement. (For a free plan to build a wood storage shed, see Ecology publication #91-62, "Woodshed Design.")
- **Prohibited materials:** Garbage, treated wood, particle board, plastics, rubber, animal carcasses, asphalt products, paint or painted materials, chemicals, or any substance which normally emits dense smoke or obnoxious odors may not be burned in a wood stove or fireplace.
- **Smoke density is restricted.** The maximum smoke plume opacity (how much you can't see through the smoke) is 20 percent, except for six minutes stoking time per hour and 20 minutes every four hours for fire starting. This is to ensure that people give enough air to their fires to promote efficient fires and less pollution.
- **Emission standards are tighter for new certified stoves and fireplace inserts sold at retail in Washington.** Stack emissions of new certified models are limited to:
 - 4.5 grams of particulate matter per hour for non-catalytic models.
 - 2.5 grams per hour for catalytic models (stoves with catalytic converters built in).
 - Stoves with at least a 35-to-1 air/fuel ratio are "non-affected;" they burn relatively cleanly already (almost all are pellet stoves) and do not require certification to be sold in Washington. (For more information on pellet stoves, see Ecology Publication number 91-126, Pellet Stoves and the Law.)
 - Look for the EPA Emission Certification label.
- **Local burn bans are called when wood smoke pollution is measured at unsafe levels.** The "trigger point" for calling burn bans was recently tightened by the legislature in response to studies that showed health can be affected by lower levels of particulate matter. There is a two stage plan for burn bans:
 - **Stage 1:** The use of all uncertified wood heating devices--including fireplaces--is prohibited when pollution approaches unhealthful levels (60 micrograms of fine particulate matter per cubic meter of air, averaged over 24 hours). Certified and non-affected stoves only may be operated during Stage 1 bans.
 - **Stage 2:** All wood heating--including certified and non-affected devices--is prohibited when pollution reaches a higher threshold (a 24-hour average of 105 micrograms of fine particulate matter per cubic meter of air).

Homes with no other source of adequate heat are exempt from these bans. Adequate heat means a system that can maintain a temperature of 70 degrees Fahrenheit three feet off the floor, when the heater is operating as designed.

- **\$30 fee on the sale of new wood stoves and fireplaces.** This supports state and local air pollution control agency wood stove education and enforcement programs.
- **Emission standards are set** for new masonry and factory built fireplaces.

Since January 1, 1997, all fireplaces offered for sale in Washington must meet certification standards comparable to the 1990 wood stove standards. Masonry fireplaces must also meet design standards that achieve similar emission reductions. The State Building Code Council devised fireplace construction standards and testing methods to meet this emission requirement.

State air pollution episodes

The Department of Ecology's four-step Air Pollution Episode Plan no longer affects indoor burning at the first step, or Forecast level. If an Episode reaches the Alert, Warning or Emergency level, Ecology can curtail the use of wood heat. The Alert level has not been called since 1981 and this applied only to downtown Tacoma. The Warning and Emergency levels have never been put into effect.

Only outdoor burning is banned under the Forecast level of a State Air Pollution Episode. Indoor burning may only be curtailed locally under the two stage program described above, based on instrument measurements of air quality.

Uncertified stove bans as a contingency measure

The 1991 legislation authorizes a local air quality authority or Ecology to prohibit the use of uncertified stoves if the U.S. Environmental Protection Agency finds and shows in writing that an area has failed to make reasonable progress in meeting federal health-based air quality standards.

Low income persons, certified and most pellet stoves, and fireplaces would be exempt from the ban.

Tips for cleaner burning

The most complete and effective way to reduce wood smoke pollution is to use another form of heat. If you must use wood, or choose to do so when local rules permit, the following recommendations can help diminish the emissions from your wood stove, fireplace or fireplace insert:

- Only burn dry, seasoned wood. Be sure your firewood has been split and dried for at least one year.
- Never burn wet, painted, stained or treated wood, color newsprint, plastic, garbage, diapers or magazines. Items such as these produce high amounts of odor, smoke and toxic fumes.
- Store your firewood under cover. A shed or shelter is best. If you use a plastic tarp, allow ventilation to prevent condensation.
- Burn small, hot fires. This helps the wood burn completely and cleanly.
- Never allow the fire to smolder. Smoldering fires are the worst polluters because they burn at a temperature too low for efficient combustion. The result is more smoke--unburned wood going up the chimney, wasted.
- Do not damper too much. Allow enough air for the wood to burn fully, without smoldering. Never try to keep the "fire" going overnight by cutting back the air supply. This wastes wood, produces much smoke and creosote and produces little heat.
- Step outside and look at the plume from your chimney. You should see only heat waves. If you can see smoke, your wood is not burning completely. Increase the air supply to your fire.
- Size your wood stove properly. A stove that is too large for the space to be heated will have to be damped down, causing much smoke and wasting wood.

- Do not burn in moderate temperatures. Your stove will tend to overheat your house. You will want to close the dampers to cut back on the heat, which cuts oxygen to the fire, wastes wood and increases pollution.
- Proper stove installation is very important. Even the least polluting certified stoves will not function well if the installation does not meet the specification for each model. (This is not the same as safety specifications, which also must be followed.)
- Don't install a wood stove until you've considered other ways to cut heating costs. Insulating and weather stripping can cost less than a stove and will reduce your heating requirements, whether your heat sources is wood, oil, gas or electricity. Many cities, counties, housing authorities and utilities offer conservation and weatherization programs in the form of grants, low-interest or interest-free loans, and free weatherization materials and installation.
- Don't install an uncertified stove--installation of uncertified stoves is illegal. These stoves are more polluting.

For more information

- **U.S. Department of Energy's Energy Efficiency and Renewable Energy Network:** Experts can answer your energy questions about home heat. For a booklet on residential energy topics, call or visit the Internet site. Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-EREC (363-3732)
http://www.eren.doe.gov/consumerinfo/energy_savers
- **Local Air Pollution Control Authorities:**
 - **Puget Sound Clean Air Agency**, serving King, Snohomish, Kitsap and Pierce Counties, 1-800-552-3565, (206) 343-8800. For recorded information on indoor burning restrictions, call: 1-800-595-4341.
 - **Olympic Air Pollution Control Authority**, serving Thurston, Clallam, Grays Harbor, Jefferson, Mason and Pacific Counties, (360) 438-8768, 1-800-422-5623. When in the local radio area, tune in 530 AM for indoor burn ban information.
 - **Southwest Clean Air Agency**, serving Clark, Cowlitz, Lewis, Skamania and Wahkiakum Counties, (360) 574-3058, 1-800-633-0709.
 - **Northwest Air Pollution Authority**, serving Skagit, Whatcom and Island Counties, (360) 428-1617, or 1-800-622-4627 (Island and Whatcom Counties only).
 - **Spokane County Air Pollution Control Authority**, (509) 477-4727.
 - **Yakima Regional Clean Air Authority**, (509) 574-1410, or 1-800-540-6950.
 - **Benton Clean Air Authority**, Richland, (509) 943-3396. For recorded burn ban information, call (509) 946-4489.
 - **Ecology's Central Regional Office**, serving Chelan, Douglas, Kittitas, Klickitat and Okanogan Counties, (509) 575-2490.
 - **Ecology's Eastern Regional Office**, serving Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla and Whitman Counties, (509) 456-2926.

If you have special accommodation needs, please call Judy Beitel at (360) 407-6878 (voice); or call (360) 407-6006 (TDD only).